CLAIMS

What is claimed is:

1. An apparatus for use in a wellbore, comprising:

an expandable bistable device configured for deployment proximate a wellbore wall, the expandable bistable device having a plurality of bistable cells arranged in a generally tubular shape, the plurality of bistable cells being stable in a collapsed configuration and in an expanded configuration.

2. The apparatus as recited in claim 1, wherein each bistable cell comprises at least two elongated members connected to each other.

3. The apparatus as recited in claim 2, wherein the collapsed configuration is a first generally tubular configuration and the expanded configuration is a second

generally tubular configuration having a larger diameter than the first generally tubular configuration.

4. The apparatus as recited in claim 3, further comprising a conveyance device able to transport the expandable bistable device to a desired location in the wellbore.

5. The apparatus as recited in claim 4, wherein the apparatus further comprises a deployment device able to initiate expansion of the expandable bistable device from its first generally tubular configuration to its second generally tubular configuration.

6. The apparatus as recited in claim 4, wherein each cell comprises a first member and a second member, the first member and the second member each comprising a mid-point and two ends, and further wherein the first member is more flexible than the second member.

7. The apparatus as recited in claim 6, wherein the first and second members are mechanically connected such

that the second member hinders deformation of the first member.

8. The apparatus as recited in claim 7, wherein the first member has two stable positions, the first stable position being where the first member mid-point is adjacent to the second member mid-point, the second stable position being where the first member mid-point is displaced from the second member mid-point to form a gap between the first member mid-point and the second member mid-point.

9. The apparatus as recited in claim 6, wherein the second member has a greater thickness than the first member.

10. The apparatus as recited in claim 6, wherein the thickness ratio of the second member to the first member is greater than approximately 3:1.

11. The apparatus as recited in claim 6, wherein the thickness ratio of the second member to the first member is greater than approximately 6:1.

12. The apparatus as recited in claim 4, wherein the bistable device further comprises a wrapping attached to the outer surface of the bistable device.

13. The apparatus as recited in claim 12, wherein the wrapping comprises an expandable screen.

14. The apparatus as recited in claim 4, wherein the bistable device further comprises a deformable material attached to the outer surface of the bistable device.

15. The apparatus as recited in claim 14, wherein the deformable material comprises an elastomer.

16. The apparatus as recited in claim 15, wherein the elastomer is selected to be resistant to crude oils, brines, and acids encountered in oil and gas wells.

17. The apparatus as recited in claim 4, wherein the bistable device in its second generally tubular configuration comprises a plurality of diameters.

18. A method of stabilizing an uncased section of a wellbore in an underground formation, comprising:

providing an expandable bistable device having a generally tubular shape that comprises a plurality of bistable cells;

placing the bistable device at a position in the wellbore while in a first stable state; and

radially expanding the bistable device to a second stable state having a generally tubular configuration without substantially reducing axial length.

19. The method as recited in claim 18, further comprising attaching a wrapping to the outer surface of the bistable device.

20. The method as recited in claim 19, wherein attaching comprises attaching an expandable screen.

21. The method as recited in claim 18, further comprising applying a deformable material to the outer surface of the bistable device.

22. The method as recited in claim 21, wherein applying comprises applying an elastomeric material.

23. The method as recited in claim 18, wherein radially expanding comprises expanding the bistable device to a plurality of final diameters.

24. A method for installing liners within a tubular located in a wellbore, comprising:

forming an expandable bistable device with a plurality of bistable cells, the expandable bistable device having a generally tubular shape;

surrounding the expandable bistable device with an expandable liner element attached to an outer surface of the bistable device;

placing the expandable bistable device at a position within a tubular while in a first stable state; and

expanding the expandable bistable device into a second stable state to hold the liner element against an inner diameter of the tubular.

25. The method as recited in claim 24, further comprising locating multiple bistable devices in the wellbore such that the ends of the adjacent bistable devices overlap and form a continuation of the liner element against the inner diameter of the tubular.

26. The method as recited in claim 24, further comprising creating each bistable cell with a thin strut connected to a thick strut.

27. A method for facilitating use of a wellbore, comprising:

inhibiting sand influx into a wellbore, wherein inhibiting comprises:

placing a bistable device at a desired position in a wellbore; and

expanding the bistable device at least partially through a nonstable range towards a stable state until the bistable device is able to exert hoop stress forces against the wellbore.

28. The method as recited in claim 29, further comprising attaching a wrapping to an outer surface of the bistable member.

29. The method as recited claim 30, wherein attaching comprises attaching an expandable screen.

30. A method of facilitating use of a wellbore, comprising:

isolating a portion of a wellbore with an expandable bistable device having a generally tubular shape formed by a plurality of bistable cells that permit the expandable bistable device to be selectively actuated between a contracted state and an expanded state.

31. A method of sealing a portion of a wellbore tubular, comprising:

locating a bistable device within a wellbore tubular adjacent to a zone to be sealed; and

expanding the bistable device against the wellbore tubular by moving the bistable device through a nonstable region towards an expanded stable state.

32. An apparatus for use in a wellbore, comprising:

a wellbore conduit having at least one bistable device.

33. The apparatus as recited in claim 34, wherein the bistable device comprises a plurality of bistable cells, each bistable cell comprising at least two elongated members that are connected to each other at their ends, the device being stable in a first generally tubular configuration and a second generally tubular configuration, wherein the second generally tubular configuration has a larger diameter than the first generally tubular configuration.

34. The apparatus as recited in claim 35, wherein the apparatus further comprises a conveyance device able to transport the apparatus to a location in a borehole.

35. The apparatus as recited in claim 36, wherein the apparatus further comprises a deployment device that initiates the expansion or collapse of the bistable device.

36. A system for facilitating communication along a wellbore, comprising:

an expandable tubing having a communication line passageway.

37. A system for facilitating communication along a wellbore, comprising:

an expandable tubing formed of a plurality of bi-stable cells, the expandable tubing having a communication line passageway.

38. The system as recited in claim 39, wherein the communication line passageway is defined by a thinned portion along the expandable tubing.

39. A wellbore tubular, comprising:

and expandable bistable tubing; and

a device mounted to the tubing.

40. The tubing of claim 41, wherein the device is selected from an electrical device, a measuring device, a meter, a gauge, and a sensor.

41. A method of routing a communication line in a well, comprising:

deploying an expandable tubing in a well;

routing at least a portion of a communication line adjacent at least a portion of the expandable tubing; and

expanding the expandable tubing.

42. The method as recited in claim 43, wherein deploying comprises running an expandable tubing formed of bistable cells into a well.

43. The method as recited in claim 43, wherein routing comprises routing a cable along an exterior of the expandable tubing.

44. The method as recited in claim 44, further comprising attaching the communication line to the expandable tubing as the expandable tubing is deployed in the well.

45. The method as recited in claim 44, further comprising forming a communication line passageway in the expandable tubing to receive the communication line.

46. The method as recited in claim 47, wherein forming comprises forming the communication line along a thick strut formed between a plurality of bistable cells.

47. The method as recited in claim 44, further comprising providing a device attached to the expandable tubing.

48. The method as recited in claim 49, wherein providing comprises attaching a sensor.

49. The method as recited in claim 49, wherein providing comprises attaching an instrument.